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CASE REPORT

Companion or pet animals

Cutaneous inflammatory lobular capillary haemangioma in a guinea pig (*Cavia porcellus*)

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Abstract

A 3-year-old entire male guinea pig (*Cavia porcellus*) was presented with a mass on the neck, which was excised surgically. Histological examination and immunohistochemistry confirmed the mass to be a tumour of endothelial origin consistent with an inflammatory lobular capillary haemangioma, despite some microscopic features triggering an initial suspicion of histological malignancy. Following surgical treatment, the patient was still alive with no evidence of local tumour recurrence 34 months after diagnosis. This case report illustrates an excellent outcome of a guinea pig with a tumour of endothelial origin arising from the skin. Surgical treatment alone appears an effective treatment for these lesions.

KEYWORDS

guinea pigs, histopathology, oncology, skin

BACKGROUND

Spontaneous cutaneous neoplasia accounts for approximately 15% of neoplasms in guinea pigs.[1] The most commonly reported tumours in order of frequency are trichofolliculoma, lipoma, trichoepithelioma and mammary gland adenocarcinoma, with cutaneous vascular tumours (cutaneous haemangiosarcoma) considered infrequent at 1.5% in a report of 133 cases with an average age of 2.75 years.[2] Spontaneous or experimentally induced vascular tumours, including haemangioendotheliomas and haemangiosarcomas, have been reported in the spleen of guinea pigs.[3–6] This group of tumours has a relatively rare presentation as justified by the weak scientific evidence.

Clinical signs depend on location and may be vague. Definitive diagnosis requires histopathology and possibly immunohistochemistry (IHC) to differentiate between an inflammatory/infective process and benign or malignant neoplasm.[7] The information such as treatment and outcomes extracted from the published case reports is imprecise and further studies are required to better classify these lesions: most of these neoplasms are cured by complete surgical excision, but prognosis and survival time are difficult to estimate as there is a paucity of cases available in the literature.[2,8]

This current report describes a case of a tumour of endothelial origin in a guinea pig, clinical presentation and outcome.

Also, this case highlights the challenges in differentiating benign from malignant neoplasms in species for which previously documented histopathological descriptions are limited to sporadic case reports.

CASE PRESENTATION

A 3-year-old entire male guinea pig (*Cavia porcellus*) was presented with a nodular 1.5 × 1 × 0.5 cm bleeding mass located in the left ventral neck area. The mass was firm, ulcerated, hairless and covered by sanguineous crusts. Palpation revealed that the lesion extended into the dermis and subcutis (Figure 1). The remainder of the physical examination was unremarkable with a good overall body condition; the guinea pig was otherwise well with no other concerns or signs of pain.

The nodule was first noted in September 2018 and increased slowly in size over the following 9 months with intermittent bleeding. The initial differential diagnosis for the mass included abscess, inflammatory lesion, epidermal inclusion cyst, sebaceous cyst, unresolving haematoma, congenital vascular defect and benign or malignant cutaneous/subcutaneous neoplasia.

Ruptured abscess from a bite wound was considered most likely as the guinea pig was housed with another more dominant male.

Both guinea pigs lived outdoors in a sheltered area in a standard hutch with access to a run and grass during the day. They were fed a commercial diet supplemented with abundant fresh forage/vegetables.

TREATMENT

The lesion was clipped and cleaned twice with water-diluted antiseptic (Hibiscrub 4% cutaneous solution - chlorhexidine gluconate) daily and given two antibiotic courses with

FIGURE 1 Neck - lateral view. Ulcerated nodular mass affecting the left side of the neck

enrofloxacin (10 mg/kg PO q24h) without any improvement. It was marginally excised in June 2019 and sent for histopathological analysis. The surgery was performed in general veterinary practice. The mass was excised with 5–10 mm lateral margins and one deep fascial plane. The subcutis was closed with 4.0 PDS (polydioxanone suture) and the skin closed with a 3.0 nylon suture. The guinea pig recovered well following the surgical treatment. Meloxicam analgesia (0.1 mg/kg PO q24h) was provided for the following 3 days.

HISTOLOGY

Histologically, the mass was a circumscribed unencapsulated dermal and subcutaneous tumour with a poorly defined lobular pattern, composed of compact areas and dilated vascular structures supported by variable amounts of fibrous stroma. The compact areas consisted of closely spaced haphazardly arranged rows and small capillary vessels with indistinct lumens and admixed with larger vascular structures surrounded by moderate amounts of fibrous stroma comprising thin septa or thicker bundles. Many dilated vessels appeared empty and some of them contained red blood cells and heterophils. Neoplastic cells were plump oval to spindle with indistinct borders and scant eosinophilic cytoplasm. Nuclei were oval, in some instances slightly elongated or minimally irregular with finely stippled to vesicular chromatin and indistinct or small multiple nucleoli. There were mild to moderate anisocytosis and anisokaryosis. Four mitotic figures in 10 high power fields, ×400, were present. In the deep portion of the section, neoplastic cells appeared to infiltrate the subcutaneous adipose tissue and separate small skeletal muscle fascicles. Variable numbers of lymphocytes, heterophils and macrophages were noted sparse among the neoplastic cells (Figure 2a–c). Margins of excision were close (<1 mm at one lateral margin).

The results of IHC showed that neoplastic cells were positive for vimentin and von Willebrand factor (Figure 2d) and negative for CD31 and cytokeratin. Histological and immunohistochemical findings supported a diagnosis of endothelial origin tumour. In consideration of the pattern and the variably prominent associated inflammatory cell infiltration, a diagnosis of inflammatory lobular capillary haemangioma was proposed.

LEARNING POINTS/TAKE HOME MESSAGES

- Surgery is the current best treatment for localised cutaneous endothelial tumour.
- Histology and immunohistochemistry are always advised to characterise the lesion as the diagnosis can be challenging.
- Guinea pigs can achieve a long survival time after the surgical removal of cutaneous haemangioma.

OUTCOME AND FOLLOW-UP

The owners elected not to pursue further staging investigations and the guinea pig received no adjunctive therapy due to the scarcity of previous cases in the literature. At the time of writing (July 2021), approximately 34 months after the diagnosis, the guinea pig was healthy on recheck physical examination with no local recurrence or clinical indication of systemic metastasis.

DISCUSSION

The most common endothelial cell tumours are haemangioma and haemangiosarcoma; these are benign and malignant neoplasms, respectively, and are described in many species at various anatomical locations.[9,10]

In dogs, haemangioma is typically a cutaneous tumour and is reported as being more common than cutaneous haemangiosarcoma.[11] Canine cutaneous haemangioma is most often a solitary mass with rare local recurrence, while cutaneous canine haemangiosarcoma is more locally aggressive with a high metastatic rate.[11] Surgical excision is the standard of care for this vascular neoplasm with adjunctive chemotherapy based on doxorubicin protocols recommended only for haemangiosarcoma invading the subcutaneous tissue.[12]

Guinea pigs are becoming increasingly popular as pets, and yet there is scant literature describing the outcome of neoplasms affecting this species. Vascular neoplasms have been described in multiple locations including internal viscera and skin. A review of the literature showed 82 cases, including spontaneous and experimentally induced neoplasms: 75 tumours were visceral (spleen, liver, reproductive tract), six were dermal and one was disseminated (Table 1).[2,4–6,13–17] Descriptions of case management were provided in just one case of splenic haemangiosarcoma and only four cases of cutaneous lesions.[4,15–17] The remaining cases in the literature were focused mainly on histological features. Only one case received a workup including haematology, biochemistry and whole-body radiography.[4] Cutaneous masses were surgically removed and reported as cutaneous haemangioma, except for one that rapidly progressed due to a bleeding process and postmortem exam described it as vascular malformation.[16]

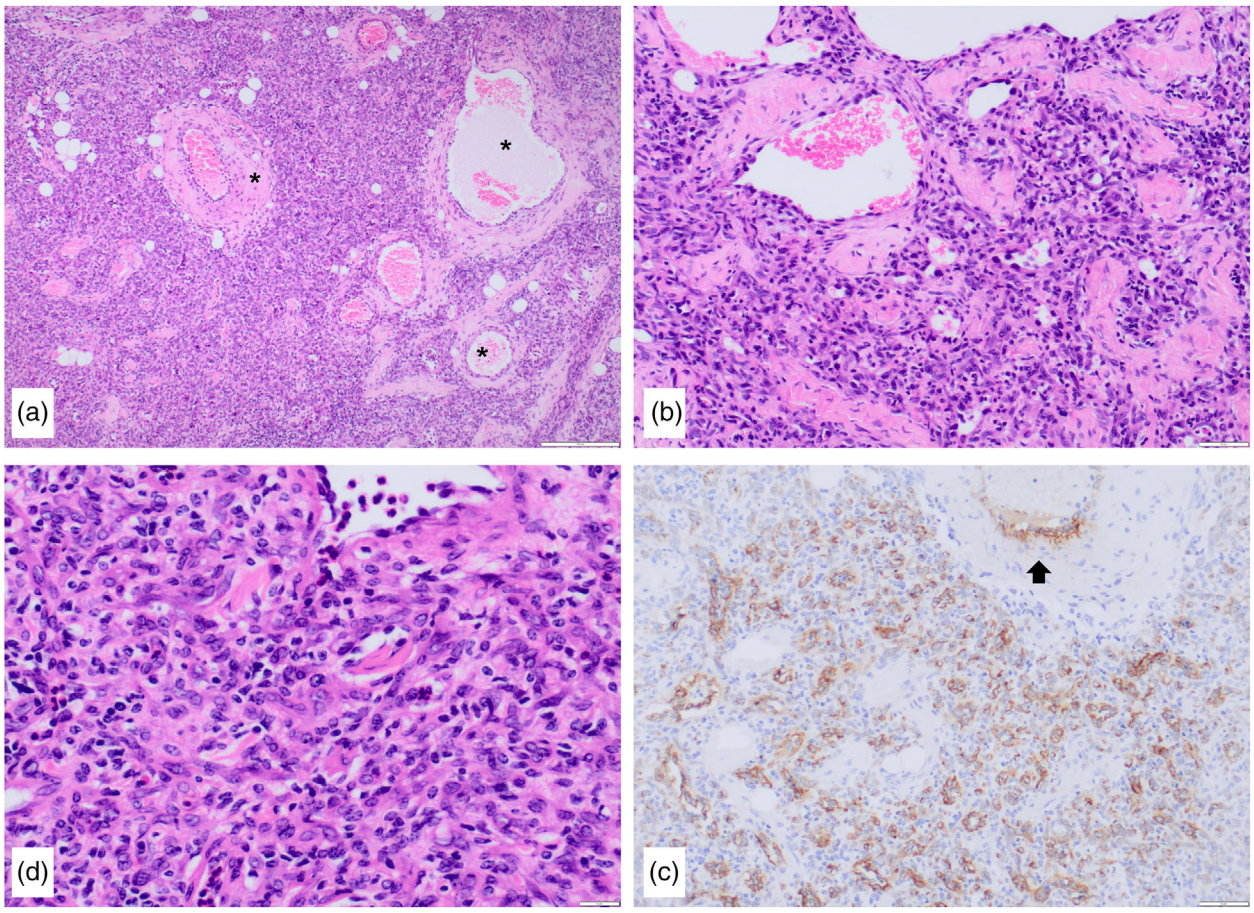

FIGURE 2 Histological (a–c) and immunohistochemical (d) features of the mass. (a) Low-power magnification of the tumour with areas consisting of anastomosing capillary structures admixed with slightly dilated vessels with a fibromuscular wall (asterisks); haematoxylin and eosin (H&E). (b) Medium magnification in an area of the tumour showing anastomosing capillary structures, admixed with slightly dilated vessels and collagenous stroma; H&E. (c) High magnification of an area of the tumour with anastomosing capillaries, frequently with indistinct or absent lumen, lined by plump cells, with associated sparse inflammatory cell infiltration; H&E. (d) Haphazardly arranged small capillary structures positive for von Willebrand factor (vWF) and admixed with negative plum ovoid to spindle cells and stroma. vWF staining also noted in the endothelial lining of a larger vessel with a prominent fibromuscular wall (arrow). vWF immunohistochemistry with Gill's haematoxylin counterstain

TABLE 1 Summary of the vascular neoplasm reported in guinea pigs including major details

Age	Number of guinea pigs	Diagnosis	Anatomical localisation	Comments	Ref.
1.5–4 years	2	Haemangiosarcoma	Skin	Spontaneous	2
18 months	1	Haemangiosarcoma	Spleen	Spontaneous	4
Up to 50 months	17	Glomerate vascular tumour	Spleen	Experimentally induced (radiation)	5
Up to 50 months	3	Glomerate vascular tumour	Spleen	Spontaneous	5
Up to 50 months	12	Sinusoidal haemangioendotheliomas	Spleen	Experimentally induced (radiation)	5
Up to 50 months	3	Sinusoidal haemangioendotheliomas	Spleen	Spontaneous	5
Up to 50 months	3	Haemangiosarcoma	Spleen	Experimentally induced (radiation)	5
Up to 50 months	1	Haemangiosarcoma	Spleen	Spontaneous	5
Up to 50 months	2	Haemangiosarcoma	Disseminated	Experimentally induced (radiation)	5
Over 3 years	1	Cavernous haemangioma	Liver	Spontaneous	14
20–40 weeks	32	Angiosarcoma	Liver	Experimentally induced (chemically)	6
31 months	1	Cavernous haemangioma	Reproductive tract	Spontaneous	13
4 years	1	Cavernous haemangioma	Skin	Spontaneous	15
5 months	1	Capillary haemangioma	Skin	Spontaneous	15
2 years	1	Haemangioma	Skin	Spontaneous	17
N.S.	1	Vascular malformation	Skin	Spontaneous	16

Abbreviations: N.S., not specified; Ref., references.

All three survived more than 6 months, with one dying from a traumatic accident approximately 2 years later.[15,17] No cases showed any regional or distant metastatic spread and none of them received chemotherapy as adjuvant or neoadjuvant treatment. This indicates that surgical excision remains the current best treatment option with limited reported information regarding chemotherapy;[3] although acute and dose-related toxicity has been noted with doxorubicin in this species.[18]

In this case, histological and immunohistochemical findings supported a diagnosis of a tumour of endothelial origin, for which we propose a diagnosis of inflammatory lobular capillary haemangioma.[19] Initial histological assessment considered a diagnosis of haemangiosarcoma as, despite being circumscribed, the tumour featured moderate cellularity, mild cellular pleomorphism and some mitotic figures, and in some areas proliferating vascular structures appeared to infiltrate the subcutaneous adipose tissue and separate skeletal muscle fascicles, raising the suspicion of subtle infiltrative behaviour.

Despite this, other histological features, including closely spaced capillary structures admixed with larger vessels and the presence of interstitial inflammatory cells, resembled previous descriptions of dermal-subcutaneous capillary haemangioma from the cheek region in a guinea pig and an erythematous mass (finally diagnosed as haemangioma) in the lip region of a 2-year-old male guinea pig.[15,17] There were also similarities to a dermal and subcutaneous vascular malformation reported in the skin of the flank region in a young adult female guinea pig, which consisted of an expansile mass characterised by variably sized and dilated vascular spaces lined by well-differentiated endothelial cells containing red blood cells, with associated extramedullary haematopoiesis, and surrounded by variably thick smooth muscle layers. The vascular spaces did not demonstrate an infiltrative behaviour but caused a separation of muscle bundles.[16]

Immunohistochemical characterisation of cutaneous/subcutaneous vascular proliferative lesions and splenic haemangiosarcoma in guinea pigs was described in some reports with neoplastic cells expressing von Willebrand factor[4,15] as in the present case, and expression of smooth muscle actin noted in the muscle layer associated with the vascular structures in the cutaneous vascular malformation.[16]

The combination of morphological features and immunohistochemical findings supported the final diagnosis in this study. Although any metastatic process or systemic involvement could not be excluded due to the lack of further investigations, the long survival time and the absence of local recurrence 2.8 years after diagnosis suggested that localised endothelial tumours may have a slow progression and low risk of metastasis when treated with marginal surgery alone.

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CONFLICT OF INTEREST

The authors declare they have no conflicts of interest.

ETHICS STATEMENT

The authors confirm that legal and ethical requirements have been met with regards to the humane treatment of animals.

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